

**In the Claims:**

Claims 14 – 31 (Cancel)

- 1 32. (NEW) In a receiver, a method for demodulating an M-ary modulated information signal received on at least one receive antenna, said method comprising the steps of:
- estimating at least one channel coefficient associated with the M-ary modulated information signal to produce at least one channel estimate;
  - pre-computing multiplication product values for a set of transmitted symbol values and a complex number, wherein the complex number comprises s-parameters in an Ungerboeck branch metric and depends on said at least one channel estimate;
  - storing the pre-computed multiplication product values in a product look-up table;
  - and
  - determining branch metrics in a nonlinear maximum-likelihood sequence-estimation equalizer through repeated use of the pre-computed multiplication product values to demodulate the received M-ary modulated information signal.
- 2 33. (NEW) The method of claim 32 wherein the set of transmitted symbol values comprises all M possible symbol values.
- 3 34. (NEW) The method of claim 32 wherein the set of transmitted symbol values comprises a subset of the M possible symbol values.
- 4 35. (NEW) The method of claim 32 wherein the complex number comprises the channel estimate.
- 5 36. (NEW) In a receiver, a nonlinear maximum-likelihood sequence-estimation equalizer for demodulating an M-ary modulated information signal received on at least one receive antenna, the nonlinear maximum-likelihood sequence-estimation equalizer comprising:
- a channel coefficient estimator for producing least one channel estimate associated with the M-ary modulated information signal;

a memory for storing a product look-up table having pre-computed multiplication product values equal to the product of a set of transmitted symbol values and a complex number, wherein the complex number comprises s-parameters in an Ungerboeck branch metric and depends on the at least one channel estimate; and

a branch metric computer for determining branch metrics through repeated use of the pre-computed multiplication product values to demodulate the received M-ary modulated information signal.

6-37. (NEW) The nonlinear maximum-likelihood sequence-estimation equalizer of claim 36 wherein the set of transmitted symbol values comprises all M possible symbol values.

7-38. (NEW) The nonlinear maximum-likelihood sequence-estimation equalizer of claim 36 wherein the set of transmitted symbol values comprises a subset of the M possible symbol values.

8-39. (NEW) The nonlinear maximum-likelihood sequence-estimation equalizer of claim 36 wherein the complex number comprises the channel estimate.

9-40. (NEW) In a receiver, a nonlinear maximum-likelihood sequence-estimation equalizer for demodulating an M-ary modulated information signal received on at least one receive antenna, the nonlinear maximum-likelihood sequence-estimation equalizer comprising:

means for producing least one channel estimate associated with the M-ary modulated information signal;

means for storing a product look-up table having pre-computed multiplication product values equal to the product of a set of transmitted symbol values and a complex number, wherein the complex number comprises s-parameters in an Ungerboeck branch metric and depends on the at least one channel estimate; and

means for determining branch metrics through repeated use of the pre-computed multiplication product values to demodulate the received M-ary modulated information signal.

10 41. (NEW) The nonlinear maximum-likelihood sequence-estimation equalizer of claim <sup>9</sup>40 wherein the set of transmitted symbol values comprises all M possible symbol values.

11 42. (NEW) The nonlinear maximum-likelihood sequence-estimation equalizer of claim <sup>9</sup>40 wherein the set of transmitted symbol values comprises a subset of the M possible symbol values.

12 43. (NEW) The nonlinear maximum-likelihood sequence-estimation equalizer of claim <sup>9</sup>40 wherein the complex number comprises the channel estimate.